

AMENDMENTS TO THE CLAIMS

1. (currently amended) A method ~~of forming a stacked device filler~~, comprising:
forming a layer of first material between two substrates of a stacked device; and
forming a layer of second material between the two substrates of the stacked device,
wherein the second material causes a reaction in a portion of the first material.
2. (previously presented) The method of claim 1, wherein the reaction comprises polymerization.
3. (previously presented) The method of claim 1, wherein said forming the layer of first material comprises diffusing the first material between a portion of the two substrates of the stacked device.
4. (previously presented) The method of claim 3, wherein the first material is selected from the group consisting of: diisocyanate monomers, a diisocyanate end-capped compliant oligomer, and p-toluenesulfonyl semicarbazide.
5. (previously presented) The method of claim 1, wherein said forming the layer of first material comprises one or more of:
injecting the first material between a portion of the two substrates of the stacked device,
spraying the first material between the portion of the two substrates of the stacked device,
or
immersing the two substrates of the stacked device in the first material.

6. (previously presented) The method of claim 1, wherein forming the layer of second material comprises diffusing the second material between a portion of the two substrates of the stacked device.

7. (previously presented) The method of claim 6, wherein the second material is selected from the group consisting of: water, a hydroxyl end-capped oligomer, and a carboxylic acid end-capped polymer.

8. (previously presented) The method of claim 1, wherein said forming the layer of second material comprises one or more of:

injecting the second material between a portion of the two substrates of the stacked device,

spraying the second material between the portion of the two substrates of the stacked device, or

immersing the two substrates of the stacked device in the second material.

9. (previously presented) The method of claim 1, wherein the reaction produces a polymer foam.

10. (previously presented) A method of forming a stacked semiconductor device, comprising:

forming a layer of material on a portion of a top surface of a substrate, said substrate having an interconnect structure formed thereon;

selectively removing a portion of the layer of material to expose a portion of a top surface of the interconnect structure;

combining the substrate with another substrate to form a stacked semiconductor device;
and

causing a reaction in a portion of the layer of material wherein a portion of an area between the two substrates is filled with a polymer foam as a product of the reaction.

11. (original) The method of claim 10, wherein the reaction comprises polymerization.

12. (original) The method of claim 10, wherein said forming comprises spin coating.

13. (previously presented) The method of claim 12, wherein the layer of material is spin coated to a thickness greater than the top surface of the interconnect structure.

14. (previously presented) The method of claim 10, wherein the selective removing comprises one or more of: chemical etch, dry etch, or mechanical etch.

15. (canceled)

16. (previously presented) The method of claim 10, wherein the layer material is selected from the group consisting of: water, hydroxyl end-capped oligomers, and carboxylic acid end-capped polymers.

17-25. (canceled)

26. (currently amended) A method ~~of forming a stacked device filler~~, comprising:
forming a layer of material between two substrates of a stacked device; and
reacting a portion of the layer of material, wherein the reaction results in the portion of
the layer of material increasing in volume.
27. (original) The method of claim 26, wherein the reaction comprises polymerization.
28. (canceled)
29. (previously presented) The method of claim 27, wherein the reaction produces a polymer
foam.
30. (currently amended) A method comprising:
depositing a first material between two substrates of a stacked device; ~~and~~
depositing a second material between the two substrates of the stacked device, ~~wherein a
reaction between the first material and the second material fills a portion of an area between the
two substrates with a polymer foam as a product of the reaction;~~ and
filling a portion of an area between the two substrates with a polymer foam as a product
of a reaction between the first material and the second material.
31. (previously presented) The method of claim 30, wherein depositing the first material
comprises one of:
diffusing the first material into the portion of the area between the two substrates;
injecting the first material into the portion of the area between the two substrates;

spraying the first material into the portion of the area between the two substrates; or
immersing the two substrates in the first material.

32. (previously presented) The method of claim 30, wherein the first material is selected from the group consisting of diisocyanate monomers, a diisocyanate end-capped compliant oligomer, and p-toluenesulfonyl semicarbazide.

33. (previously presented) The method of claim 30 wherein depositing the second material comprises one of:

diffusing the second material into the portion of the area between the two substrates;
injecting the second material into the portion of the area between the two substrates;
spraying the second material into the portion of the area between the two substrates; or
immersing the two substrates in the second material.

34. (previously presented) The method of claim 30, wherein the second material is selected from the group consisting of water, a hydroxyl end-capped oligomer, and a carboxylic acid end-capped polymer.

35. (currently amended) A method comprising:

forming a layer of material on a substrate including an interconnect structure formed thereon;

removing a portion of the layer of material such that a top surface of the layer of material is lower than a top surface of the interconnect structure to expose ~~a~~ the top surface of the interconnect structure;

combining the substrate with another substrate; and

filling an area between the two substrates with a polymer foam as a product of a reaction in the layer of material.

36. (previously presented) The method of claim 35, wherein the reaction in the layer of material comprises polymerization.

37. (previously presented) The method of claim 35, wherein forming the layer of material comprises forming the layer of material to a thickness greater than the top surface of the interconnect structure.

38. (previously presented) The method of claim 35, wherein the layer material is selected from the group consisting of water, hydroxyl end-capped oligomers, and carboxylic acid end-capped polymers.

39. (previously presented) A method of forming stacked wafers comprising:
providing a first wafer having a first conductive interconnect structure;
providing a second wafer having a second conductive interconnect structure;
bonding the first conductive interconnect structure to the second conductive interconnect structure; and
providing a foam filling an area between the first and second wafers adjacent to the first and second conductive interconnect structures.

40. (previously presented) The method of claim 39, further comprising:

thinning at least one of the first and second wafers, said foam providing structural support to the stacked wafers during said thinning.

41. (previously presented) The method of claim 39, further comprising:

protecting the first and second interconnect structures from oxidation using said foam during a subsequent wafer process.